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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

TUCKER, ZACHARY C

ART UNIT PAPER NUMBER

1624

DATE MAILED: 01/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/790,810	Applicant(s) CHE ET AL.	
	Examiner Zachary C. Tucker	Art Unit 1624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 9-13 is/are rejected.
- 7) ☒ Claim(s) 7,8 and 14-17 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recitation of “said compound” in claim 2 is ambiguous, for there are four compounds enumerated in claim 1, from which claim 2 depends. In claim 1, the cyclic sulfamidate, the sulfamate, the oxidant, and the metalloporphyrin are *compounds*. It is conceivable that any of the compounds enumerated in claim 1 could be sulfamate esters – the oxidant could be a sulfamate ester peroxide, the product could be substituted with a sulfamate ester group; even the metalloporphyrin could comprise a sulfamate ester group.

Claim 2 has been examined as though the phrase “said compound” read “said sulfamate compound.”

Claim 11 is also rejected under 35 U.S.C. 112, second paragraph as being indefinite, because it specifies that “M” is “a metal,” which is broader in scope than the definition of “M” recited in claim 10, from which 11 depends. Claim 10 defines “M” as a transition metal. Claims 12 and 13 depend from claim 11, and incorporate this additional point of indefiniteness as well. Claim 11 has been examined as though “M” in that claim were a transition metal.

The MPEP directs the examiner to apply art against a claim if the degree of uncertainty about the claim's meaning is not great, and where at least one interpretation of that claim would render it unpatentable over the prior art (2173.06).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Espino et al, "Synthesis of 1,3-Difunctionalized Amine Derivatives through Selective C-H Bond Oxidation" *Journal of the American Chemical Society*, vol. 123, pages 6935-6936 (2001), in view of Aoyama et al, "Catalytic Reactions of Metalloporphyrins. 3¹. Catalytic Modification of Hydroboration-Oxidation of Olefin with Rhodium(III) Porphyrin as Catalyst" *Journal of Organic Chemistry*, vol. 52, pages 2555-2559 (1987).

At the time the invention was made, the method according to claims 1-6, 9 and 10 would have been obvious to one of ordinary skill in the art, given the teaching of Espino et al in view of Aoyama et al.

Espino et al teaches a method of synthesizing cyclic sulfamidate compounds, specifically 1,2,3-oxathiazines or 1,2,3-oxathiazoles, by intramolecular oxidative amination reaction. A nitrogen-carbon bond forms via oxidation of a C-H bond, which gives rise to the cyclic structure. The reaction scheme is shown on page 6935, figure 1.

Dirhodium tetraacetate or dirhodium tetraoctoate are employed as the catalytic entities in the reactions reported (see caption in Table 1, page 6935). The reactions are

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effected in dichloromethane, as specified in claims 4 and 9, an inorganic base, MgO is employed in the synthesis, as specified in claims 1, 5 and 9; rhodium is a transition metal, as specified in claims 6 and 9; the oxidant is iodosobenzene diacetate, as specified in claim 3. The starting sulfate compound is a sulfamate ester, as specified in claim 2. Entries in Table 1 on page 6935 of Espino et al show either 2 or 5 mol % catalyst.

The deficiency of Espino et al is that the reactions reported therein do not rely on rhodium metalloporphyrin as the catalytic entity. A general statement, however, to the effect of "C-H amination under Rh-catalysis has general applicability with a range of structurally disparate starting materials" is provided in column 2 on page 6935. Reference to rhodium catalyzed C-H amination, generally, is a suggestion that other forms of rhodium are of use in catalyzing the reactions taught in the reference. Given this teaching, the student of Espino et al, guided by a desire to find more potent rhodium-based oxidation catalysts with which to effect formation of cyclic sulfamides from acyclic sulfamate esters, would look to the prior art for rhodium-based catalysts having advantageous properties.

Aoyama et al discloses oxidation of olefins with a rhodium porphyrin complex, (octaethylporphyrinato)rhodium(III) chloride and tetraphenylporphyrinato)rhodium(III) chloride, in typical molar percentages on the order of 0.05% (page 2556, under "Results" – typical procedure wherein 12mmol of substrate to 6.0 μ mol catalyst; 6.0 μ mol/12,000 μ mol X 100% = 0.05%). The reaction disclosed by Aoyama et al different than those reported by Espino et al. What is similar, however, is that a rhodium-based oxidation catalyst is employed in both. Given the suggestion in Espino et al, noted above, that what is disclosed therein are rhodium-catalyzed reactions, in

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general, and given that porphyrin complexes of rhodium, employed as oxidation catalysts, are old, as evidenced by Aoyama et al, one of ordinary skill in the art would clearly find it obvious to substitute the rhodium salt employed in Espino et al's syntheses for Aoyama et al's rhodium porphyrin complex. The motivation would be to effect the formation of cyclic sulfamidates with very small molar percentages of catalyst. Rhodium compounds are highly priced, making any means for decreasing the necessary amount of such compounds attractive to the synthetic chemist. Work-up of the products of a reaction wherein only very small amounts of catalysts are necessary becomes simplified to some extent as well, since less must be removed from the product after completion of the reaction.

The porphyrin catalyst disclosed by Aoyama et al is embraced by the structural formula for the same depicted in instant claim 10, wherein $R^1 - R^{12}$ are either phenyl or alkyl (ethyl), and L is halogen (chloride).

Claim Objections

Because there is no comma between the phrase "claim 1" and the word "effected" in claims 4 and 5, the preamble of those two claims literally read on claim 1 being effected in a solvent. As such, the claims describe the method of claim 1 in terms not recited in claim 1. Claim 1 does not specify "effected in a solvent." A comma between "claim 1" and effected in both claims 4 and 5 would correct this informality.

Declaration

The declaration is objected to under 37 C.F.R. 1.63(c)(1), as it is defective because neither inventor's post office address is included therein.

Allowable Subject Matter

Claims 7, 8 and 14-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 11-13 would be allowable if rewritten to overcome the rejections under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Formation of cyclic sulfamidates from acyclic sulfamate esters, as disclosed by Espino et al, are not known from the prior art to be catalyzed by any other transition metal than rhodium. Substitution of a different transition metal for the rhodium-based catalysis taught by Espino et al is not seen as an obvious modification. Thus, claims 7 and 8 are deemed allowable.

Metalloporphyrin catalysts having the characteristics and molecular structures specified in claims 11-17 are not seen as being obvious over the teachings of Aoyama et al.

Conclusion

Any inquiry concerning this communication should be directed to Zachary Tucker whose telephone number is (571) 272-0677. The examiner can normally be reached Tuesday-Thursday from 8:00am to 4:30pm or Monday from 6:00am to 1:30pm. If Attempts to reach the examiner are unsuccessful, contact the examiner's supervisor, James O. Wilson, at (571) 272-0661.

The fax number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1600.

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